How does *P. aeruginosa* respond to urine and urea?
P. aeruginosa has a conserved transcriptional response to mammalian urine

Down regulated genes

Stephanie Cole  Cherissee Hall
Cole, Hall et al, Nature Communications 2018
Down-regulated genes are controlled by quorum sensing.

Rhamnolipid
Elastase
Phenazines

Cole, Hall et al, Nature Communications 2018
Urine and Urea suppress QS-regulated phenotypes

Cole, Hall et al, Nature Communications 2018
Urea inhibition of *P. aeruginosa* QS signaling is reversible

Cole, Hall *et al*, Nature Communications 2018
Urea inhibits perception of QS molecules rather than production.

QS molecules are produced by *P. aeruginosa* grown with 0.5 M urea.

0.5 M urea interferes with perception of QS by *P. aeruginosa*.

Cole, Hall *et al*, Nature Communications 2018
QS is dispensable for *P. aeruginosa* CAUTI

Cole, Hall et al, Nature Communications 2018
Urea suppresses QS by clinical *P. aeruginosa* isolates

Maren Schniederberend and Barbara Kazmierczak in Cole, Hall *et al*, Nature Communications 2018
Conclusions

• Host urine contains urea that alters *P. aeruginosa* to utilize a biofilm that is dependent on extracellular DNA

• Host urine alters *P. aeruginosa* transcription response by shutting down QS signaling

• *P. aeruginosa* factors that contribute to CAUTI are distinct from virulence factors required for infections at other sites
Future Directions

• What are the virulence factors of \textit{P. aeruginosa} that contribute to CAUTI?

• What is the mechanism of inhibition of QS by urea/urine?

• What is the metabolic change of \textit{P. aeruginosa} during CAUTI?
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